# APPENDIX A
# (Declaration of Karin Scherer)

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Title: | Method for obtaining a thin stabilized, fluorine-doped silica layer, thin layer obtained and application thereof in ophthalmic optics |
| Appl. No.: | 10/523,951 |
| Applicants: | Scherer et al. |
| Filed: | February 8, 2005 |
| TC/A.U.: | 1775 |
| Examiner: | Langman, Jonathan C. |
| Docket No.: | ESSR:090US |
| Customer No.: | 32425 |
| Confirmation No. | 8552 |

CERTIFICATE OF MAILING

37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited with the U.S. postal service with sufficient postage as First class Mail in an envelope addressed to: commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date below:

7/May 2007 Michael R. Krawzsenek

Date Michael R. Krawzsenek

DECLARATION OF KARIN SCHERER UNDER 37 C.F.R. §1.132

Commissionner for Patents
P.O. Box 1450
Alexandria, VA 22313-01 450

I, **Karin Scherer** declare that:

I am a German citizen residing at 37bis avenue Miss Cavell 94100 SAINT MAUR DES FOSSES, FRANCE. I am currently employed as research worker at the R&D department of ESSILOR INTERNATIONAL (COMPAGNIE GENERALE D'OPTIQUE), Materials, Thin Films Group, where I have been employed since 2001.

My background is in physics and material science. I have been awarded a PhD in optics and photonics in 2001 from the Pierre and Marie Curie University, Paris, France. I am currently in

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charge of studies on thin films for antireflective stacks within the R&D department of ESSILOR INTERNATIONAL at SAINT MAUR DES FOSSES, FRANCE.

I am familiar with United States patent application 10/523,951 filed on February 8, 2005, being one of the named inventors. I have reviewed the pending claims 22-67 for this application.

I understand that the Examiner in charge of assessing the patentability of the above-referenced application has rejected pending claims 18-67 under 35 U.S.C. 103(a) as being unpatentable over reference EP 0975017 in view of reference US 5,719,705, and/or over reference EP 0975017 in view of reference US 5,719,705, in view of Lee et al. (*Surface and Coatings Technology*, 128-129:280-285, 2000), and/or over references US 5,719,705 and Lee et al., in view of reference EP 0975017. I have reviewed the Non-Final Office Action dated January 11, 2008 and the cited references.

This declaration aims at showing that a $SiO_2$ coating, which has been deposited by vapor phase deposition without using ion assistance, cannot be used as a protective layer for stabilizing a $SiO_xF_y$ layer.

## II. Experiment

### II.1. General conditions

I have conducted the below described comparative experiment in Essilor's laboratory, when I was a second year PhD student at the Pierre and Marie Curie University, Paris, France in the "Laboratoire d'Optique des Solides" laboratory between February and October, 1999.

### II. 2. Materials and methods

The device used for layer deposition was a Leybold Heraeus vacuum chamber adapted to reach a basic vacuum of $5.10^{-5}$ Pa equipped with an ion gun MARK II Commonwealth gun, and a Leybold ESV electron gun. The vacuum chamber comprised gas feed drive devices for the ion gun, a BROOKS mass flow control device for argon gas, itself controlled by a MARK II control device. For feeding the rare gas and the polyfluorocarbon compound, mass flow control devices were used such as the multigas control device MKS 647 B in which the nature and flow rate of the gases can be programmed.

This is the same device as described in pending United States patent application No. 10/523,951. It can be used for a $SiO_xF_y$ deposition with or without any ion assistance.

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The refractive indexes have been determined at 25°C for the $SiO_xF_y$ layers obtained for $\lambda = 632$ nm from ellipsometry spectra.

The presence or absence of water in the $SiO_xF_y$ / $SiO_2$ layer system has also been determined through the presence or not of a peak between 3400 and 3600 $cm^{-1}$ in the infrared spectra of such a layer.

All disclosed thicknesses are physical thicknesses.

II. 3. Description of the comparative example

A fluorine-doped silica layer ($SiO_xF_y$) and a $SiO_2$ layer were successively deposited onto a flat Si wafer in the following manner:

The vacuum chamber was placed under a vacuum of $2.10^{-3}$ Pa (measured by means of a hot cathode gauge). The ion gun was initiated with argon gas, then $CF_4$ gas was introduced at the selected flow rate and the argon flow was interrupted. The silica ($SiO_2$) particles located in a crucible were preheated by the electron beam gun. The electron beam gun and the ion gun were both equipped with a plug, and both plugs were opened simultaneously. The thickness of the deposit was regulated by a quartz micro-balance near the sample substrates.

The $SiO_xF_y$ layer was deposited at a 0.8 nm/s rate. When a 80 nm thick $SiO_xF_y$ layer was obtained, the $CF_4$ flow and the ion gun were stopped. The deposition of a $SiO_2$ layer onto the $SiO_xF_y$ layer was started at a 0.8 nm/s rate until a 45 nm thick $SiO_2$ layer was obtained. The shutter of the electron beam gun was then closed and its power was turned off. Then the vacuum of the vacuum chamber was broken.

Therefore, coated Si wafers were prepared using the same method as described in United States patent application No. 10/523,951, except that no ion assistance was used for the formation of the $SiO_2$ external layer. In other words, the $SiO_2$ layer being formed was not bombarded with a beam of positive ions formed with an ion gun.

The deposition conditions and the thickness of the $SiO_xF_y$ and $SiO_2$ layers are indicated in the following table.

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Deposition condition for the $SiO_xF_y$ layer

| Reference | $SiO_xF_y$ thickness [nm] | $CF_4$ flow rate [$cm^3$/minute] | Anode current [A] | Anode Voltage [V] |
|---|---|---|---|---|
| Comparative Example B | 80 | 3 | 0.7 | 100 |

Deposition conditions for the $SiO_2$ layer

| Reference | $SiO_2$ thickness [nm] | Gas flow rate [$cm^3$/minute] | Anode current [A] | Anode Voltage [V] |
|---|---|---|---|---|
| Comparative Example B | 45 | — | — | — |

It is worth noting that the ratio (thickness of the $SiO_xF_y$ layer) / (thickness of the $SiO_2$ layer) is almost the same in comparative example B (1.78) as in example 1 of United States patent application No. 10/523,951 (1.95).

II.4. Results

The results are presented in the following table:

| | Comparative example B | |
|---|---|---|
| Time after deposition | n ($SiO_xF_y$) @ 632 nm | Presence of water |
| 1 hour | 1.400 | yes |
| 1 month | 1.458 | yes |

**III. Conclusion**

The refractive index of the $SiO_xF_y$ layer increases from 1.40 to almost 1.46 ($SiO_2$ refractive index) over 1 month, while the $SiO_xF_y$ layers protected according to the claimed invention exhibit a refractive index that does not change for at least several months, as evidenced by the examples of United States patent application No. 10/523,951. See e.g. examples 2 and 4-6, in which a $SiO_2$ layer prepared according to the claimed invention and having the same thickness as the $SiO_2$ layer of comparative example B is capable of stabilizing $SiO_xF_y$ layers having thicknesses as high as 210 nm. See also e.g. example 7, in which a very thin $SiO_2$ layer (10 nm) prepared

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according to the claimed invention is capable of stabilizing a $SiO_xF_y$ layer having a thickness of 92 nm.

Comparative example B clearly demonstrate that a $SiO_2$ layer formed following the teachings of reference EP 0975017, namely without using ion-assisted deposition employing an ion gun, is not capable of stabilizing a $SiO_xF_y$ underlying layer, the latter having a refractive index which is not stable over time.

I declare that all statements made in this declaration of my knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of title 18 of the united states Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

April, 17, 2008
Date

U. Scherer
Karin Scherer

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